A FOLDING RELIEF MAP

FIELD

This invention relates to folding maps or guides printed on a sheet material which is folded into a compact form for storage and which is unfolded or partially unfolded for use.

BACKGROUND OF THE INVENTION

The maps or guides for mountainous areas are typically provided as a foldable flat sheet with the topography of the area shown either pictorially on the sheet or by the use of contour lines or by a combination of both.. During the winter season when the ground is covered in deep snow there may be difficulties in relating the map to features on the ground. This is a particular problem in relation to maps and guides produced for use by skiers at ski resorts. The mass of skiers may not be expert map readers and there are problems with skiers becoming lost or dis-oriented after being carried to the top of a ski run by a ski lift and then skiing down a slope via a route where they lose sight of the ski-lift or other prominent landmark features. Such problems may also occur on bare hills and mountains when the map reader has little or no expertise.

The conventional folded map may also be difficult to handle in conditions of extreme cold when the use is wearing gloves or mittens and typically may need to remove the gloves in order to facilitate use of the map.

OBJECT OF THE PRESENT INVENTION

The present invention seeks to provide a map or guide which is more easily related to the topography of a hilly or mountainous area, including underwater topographies.

STATEMENTS OF INVENTION

According to a first aspect of the present invention there is provided a map or guide for a hilly or mountainous area in which the topography of the area is represented graphically on at least one side of a foldable sheet, the sheet having folds therein whereby the sheet can be formed into a three dimension shape representative of the topography of said area with features represented graphically being substantially coincident with topographical feature formed in the three dimensional shaped sheet when the map is in a partially unfolded condition for reading.

The map may comprise a plurality of valleys and ridges, typically upto five valleys with associated ridges . However other topographical areas may also be represented in 3D form such a basin with surrounding slopes or a single peak or hill top with surrounding slopes.

Preferably the typography is formed in the sheet by means of a plurality of major linear folds at least some of which are intersected with a plurality of further linear folds, and preferably some of said further folds extend between adjacent major folds . The major folds may be formed substantially radial to an imaginary circle.

Each major fold preferably intersects at a point with three of said further folds and the four intersecting folds are arranged such that a first line passing through said point and which is normal to a second line also passing through said point and bisecting two substantially oppositely extending folds, forms substantially equal angles between said first line and the oppositely extending fold and equal angles between said second line and the other two folds.

For a topographical area comprising a plurality of major valleys with associated ridges, each major valley and ridge is represented as a major fold in the sheet with the further folds in said sheet that intersect with the respective major folds forming side valleys, ridges, slopes etc. interconnected with a respective valley and/or ridge.

When one of said further folds extends from a major fold representative of a valley floor towards a fold representing a ridge it forms a bias angle to the ridge fold line and preferably intersects with another of said further fold lines from the adjacent valley also extending towards said ridge. The point of intersection may be on the edge of the map or off the map.

The sheet may be provided with at least some of notches, cut lines, slits, and apertures to further provide for the three dimensional shaping of the sheet.

One end portion of the folded sheet is secured to one leaf of a foldable cover allowing the map to be stored between a foldable cover when the map is in a compact folded condition.

The map sheet preferably comprises a water proof material selected from a plastics or wax impregnated paper, paper laminated with a transparent overlay, or plastics sheet matrial.

The map sheet may be formed from a resilient material so that the folded the map will spring into 3D format on release from the cover.

According to another aspect of the invention there is provided a method of making a map or guide for a hilly or mountainous area wherein in said method the topography of the area

is represented graphically on at least one side of a foldable sheet, the sheet being folded along lines which facilitate the sheet taking up a three dimensional form representative of the topography with feature represented graphically on the sheet being substantially coincident with respective features formed in the shaped sheet , the map when partially unfolded for reading showing the topography in relief.

A first set of major folds are made in said sheet substantially coincident with major features represented on the map and then further linear folds are made in the sheet that intersect with at least one major fold and which may be coincident with secondary features interconnecting with the major features . At least some of said further folds are formed to extend between adjacent major folds .

When the map represents a hilly or mountainous area, the sheet may be folded along major fold lines each of which is substantially coincident with a respective floor of a valley or a respective ridge represented on the map, and at least some of said further fold lines form topographical features connecting with said ridges and valleys.

At least some of said further folds are formed to extend between adjacent major folds each coincident with a ridge and neighbouring valley floor. Further fold lines extending from neighbouring major valley folds towards a major fold representing a ridge are at a bias angle thereto and intersect either on the edge of the map or off the map.

Three said further folds are formed in said sheet coincident with slopes and side valleys at the head of at least one valley represented thereon and which all intersect a respective

major fold coincident with the valley floor and are caused to intersects at a point substantially coincident with the head of the valley.

The four intersecting folds are formed in the sheet such that a first line passing through said point and which is normal to a second line passing through said point and bisecting two substantially oppositely extending folds, forms substantially equal angles between said first line and the oppositely extending folds and other substantially equal angles between the second line and the other two folds

DESCRIPTION OF THE DRAWINGS

The invention will be described by way of Example and with reference to the accompanying drawings in which :

Fig.1	is plan view of a development of the map showing the fold lines,
Fig. 2	is a schematic diagram showing an arrangement of the folds for creating a 3-D effect,
Fig.3	shows the map with the folds made therein showing in 3D the valleys and ridges of a mountainous area, and
Fig.4	shows the map mounted in a protective cover .

DETAILED DESCRIPTION OF THE INVENTION

The invention relates to maps or guides which present the topography of an area, particularly a hilly or mountainous area in relief . The map begins as a planar blank 10 as shown in Fig.1 in which the topography of the land is graphically represented in a pictorial and/or schematic manner. The final 3-D map is not meant to be an accurate representation of the

area but is intended as a guide showing the major landmarks and features of the landscape in an easy to assimilate form. The manner of the representation of the area on the blank 10 will take account of distortions that occur when going from a planar to a 3-D shape and will also be arranged so that particular topographical feature such as the major valleys, gorges, slopes and mountain ridges in the area may be defined by substantially straight lines.

As by way of example only the area shown in Fig.1 comprises a plurality of side by side valleys with associated ridges however other topographical forms may also be displayed in 3D form.

As shown in Fig.1 , the present map relates to three valleys and linear major folds 11,12 & 13 are arranged coextensively with representations of the valley floors of the major valleys and linear major folds 14 & 15 are arranged coextensively with the representations of the mountain ridges between the valleys. As can be seen in the upper part of Fig. 1, the pictorial representation of a mountain range 16 is shown at the heads of the major valleys 11-13 and any side valleys and slopes connecting the mountain range 16 with the major valleys and ridges may be represented by further linear folds arranged in groups of three folds 21,22,23.: 24,25,26: and 27,28,29. The major fold lines 11-15 are substantially radial to an imaginary circle struck from their point of intersection.

For the sake of simplicity the fold lines for each valley will be described with reference only to a single major valley fold, for example fold 12. The respective group of three further folds 21-23 is arranged to intersect the major fold 12 at a point P substantially coincident with the head of the valley floor on the schematic map.

With reference also to Fig.2, to enable the flat blank 10 to fold up into a compact shape for storage and to partially pop-up into a partially unfolded 3-D form, the groups of folds should have defined relationship with each other. The major fold 12 and its oppositely extending fold 22 are bisected by an imaginary line X. An imaginary line Y , normal to the line X, is drawn through the point P. Then, the angle α between the fold 12 and the normal Y is substantially equal to the angle β between the further fold 22 and the normal Y, the angle δ between the further fold 21 and the line X is substantially equal to the angle θ between the fold 23 and the line X. The folds 12 and 22 are formed first in the blank 10 and the folds 21 & 23 formed subsequently in accordance with the above relationship. As shown the further folds 21,23 will be substantially coextensive with side valleys on the map and the fold 22 will represent a ridge from the mountain range 16.

The above relationship is repeated for the other major folds 11,13 and their respective groups of further folds 24-26 & 27-29.

In some cases the angles α,β,δ, & θ may be substantially equal with the folds 21 and 12 normal to each other and the fold 22 and 23 also normal to each other.

Several of the further folds 26,21,23, 27, & 28 extend between two major folds, for example fold 26 extends from the point of intersection P1 on major fold 11 towards major fold 14 and fold 21 extends from the point P2 on major fold 12 also towards major fold 14. The folds 26 and 23 would intersect at a location just beyond the edge of the map. Similarly, folds 23 and 27 extend from their respective points on intersection towards the major fold 15 at a bias thereto to intersect at a point just of the edge of the map.

The ridge fold 14 also intersects with a similar group of three further folds 31,32,33 at a point P4 at the end thereof away from the mountains 16.

The relationship between the various folds enables the blank 10 to be folded to take up a 3D shape as is shown in Fig. 3. which is representative of the actual topography of the mapped area.

The relationship between the folds also allows the map to be folded into suitable compact shape for storage in a protective sleeve or a folding cover 40 as is shown in Fig. 4 in which one of the major fold lines 11 is aligned with the fold crease 43 between two leaves 41,42 of the cover 40. Once folded the map may be retained in the cover by a clip .

The map in the partially unfolded condition shown in Fig.4 can be easily folded into its compact form for storage within the cover by a person having gloved hands.

The outer edge of the map blank 10 can be any desired shape which is required to show the mapped area and which allows for the incorporation of the necessary fold lines for showing the topography with the ability to be folded into a compact shape for storage.

The sheet may be provided with any combination of slits, cut lines, notches and apertures to assist in folding and the formation of the 3D shape.

The map blank 10 may be made from any suitable material, preferably a water-proof material such as waxed impregnated paper, plastics impregnated paper, paper/ plastics

laminate, and transparent or translucent plastics sheet such as polypropylene The map 10 should have sufficient resilience that on release from the cover 40 it springs into 3-D form.

A plurality of maps may be stored together in a single cover as for example within a book of maps.